

Roctool Technology
Testreport
Investigation of weld line strength
TOPAS COC

Background

- Roctool's patented technology consists of designing a Heat & Cool layout in order to provide a fast and homogeneous heating. Flexible inductors will allow to follow any complex shape of tooling, while using any metallic alloys from standard steel to more marginal alloys as invar for dedicated applications. A high frequency current will be generated to run through the inductors, creating eddy currents and joule effect to heat up the mold surface. Using standard cooling channels with water and ensuring a fully turbulent flow rate enables efficient cooling of the tool.
- Plates and tensile bars were produced by Roctool with and without their Technology.
- The plate and tensile bars were visible inspected between polarization films. And the tensile bars were additionally used for a tensile test.
- www.roctool.com

Main results:

- Roctool Technology reduces internal stress and improves that weld lines are less visible.
- Roctool Technology shows nearly similar mechanical properties than standard TOPAS tensile test. The tensile bars molded by Roctool without their molding technology shows brittle behavior.

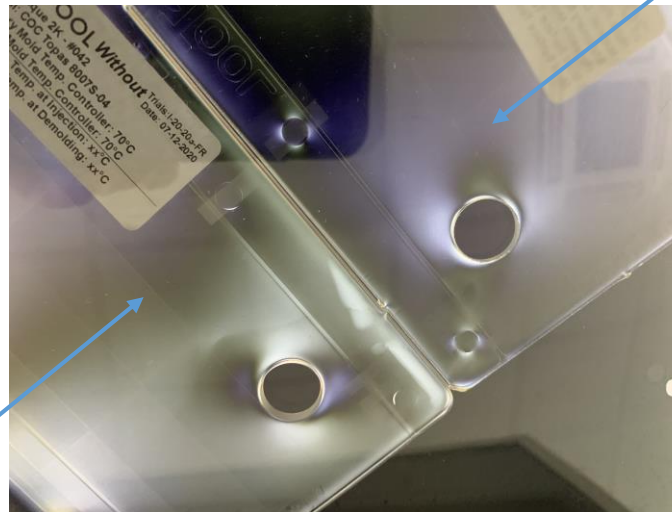
Comparison molded plates by Roctool between polarized films

- Material TOPAS 8007S-04
- Molded plates with weld line behind hole

With Roctool Technology

Stationary Mold Temp. Controller: 30°C
Moveabel Mold Temp. Controller: 70°C
Mold Surface Temp. at Injection: 150°C
Mold Surface Temp. At Demolding: 60°C

Flow-direction



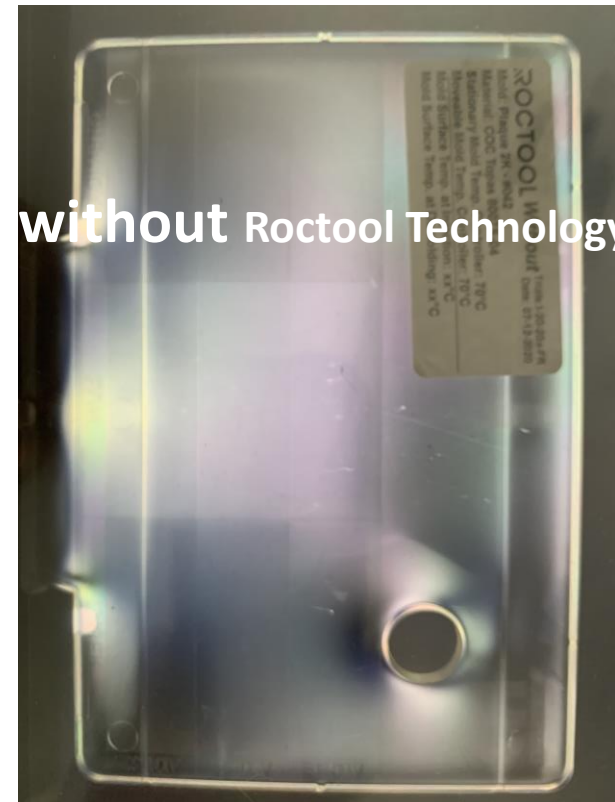
flowdirection

Without Roctool Technology

Stationary Mold Temp. Controller: 70°C
Moveabel Mold Temp. Controller: 70°C
Mold Surface Temp. at Injection: xx°C
Mold Surface Temp. At Demolding: xx°C

- Result: Roctool Technology reduces internal stress and improves that weld lines are less visible.

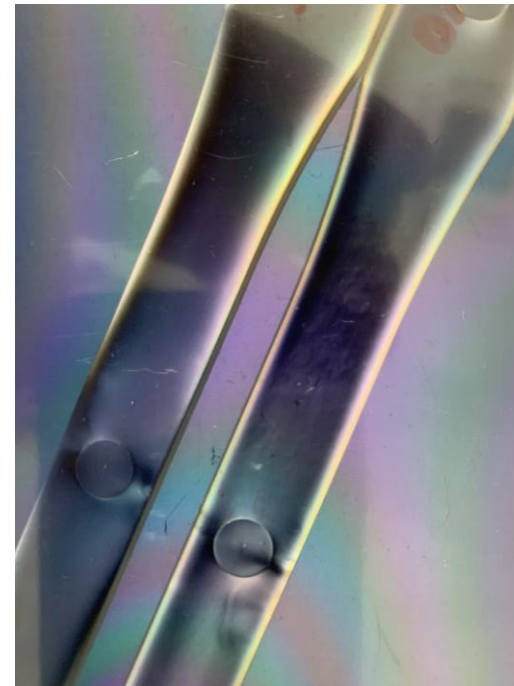
Polarization and internal stress of molded TOPAS 8007S-04 plates



- Result: The parts without Roctool technology (right picture) show more polarization and accordingly more internal stress. Especially at the weld line.

Polarization and internal stress of tensile bars TOPAS 8007S-04 molded by Roctool, gated from two sides (with weld line)

Left tensile bars with Roctool Technology



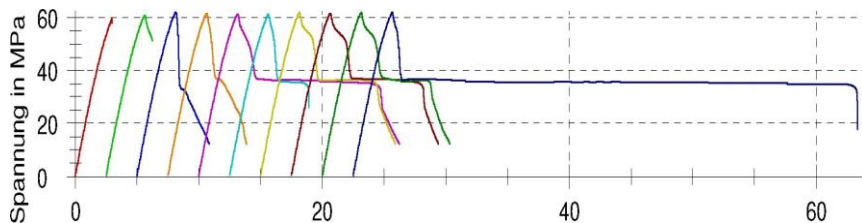
- **Results: On the tensile bars the difference of polarization and weld line visibility is not so distinctive.**

Tensile Test TOPAS 8007S-04

molded by Roctool, gated from two sides (with weld line)

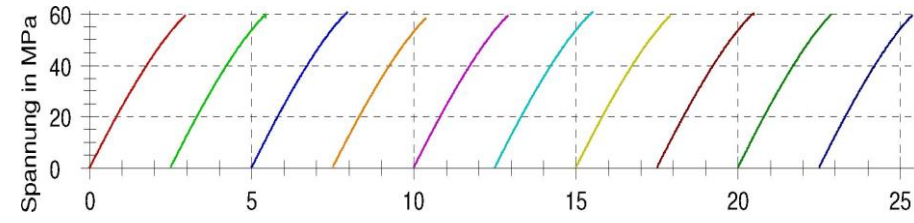
with Roctool Technology

Et	Gy	G50	Gm	Gb	fy	fM	fB	ftM	ftB
MPa	MPa	MPa	MPa	MPa	%	%	%	%	%
2580	61,6	-	61,4	22,7	3,1	3,1	12	3,1	12



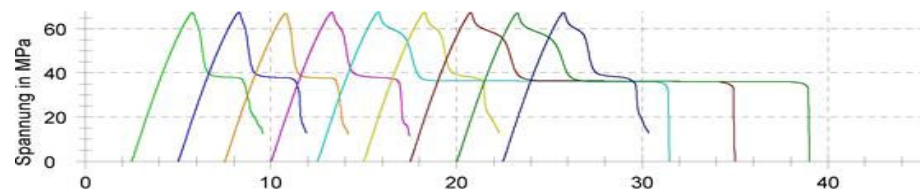
without Roctool Technology

Et	Gy	G50	Gm	Gb	fy	fM	fB	ftM	ftB
MPa	MPa	MPa	MPa	MPa	%	%	%	%	%
2600	-	-	59,8	59,6	-	2,8	2,8	2,9	2,9



standard TOPAS 8007S-04 tensile bars one side gated (without weld line)

Et	Sy	G50	Sm	Sb	fy	fM	fB	et M	etB
MPa	MPa	MPa	MPa	MPa	%	%	%	%	%
2610	67,4	-	67,4	33,0	3,3	3,3	11	3,3	11



Results: Roctool Technology shows nearly similar mechanical properties than standard TOPAS tensile test. The tensile bars molded by Roctool without their molding technology shows brittle behavior.